

IWASAKI ET AL. -- 10/801,563  
Client/Matter: 008312-0308798

### REMARKS

With this Amendment, claims 1 and 10 are amended and claims 2, 3, 7, 12, 13, and 17 are cancelled, leaving claims 1, 4-6, 8-11, 14-16, 18 and 19 pending in the application. The outstanding rejections are respectfully traversed in light of the claim amendments above and the following comments.

#### Claim Rejections -- 35 USC 103

In paragraph 2 of the Office Action, claims 1-19 are rejected under 35 USC 103 as being unpatentable over Oikawa (US2002/0136926) ("the '926 application") with either Oikawa (US6884520) ("Oikawa '520") or Shimizu (US 6699600). This rejection is respectfully traversed.

Claims 1 and 10 have been amended to recite, among other things, that "the grain boundary material contains at least one boride selected from the group consisting of  $\text{AlB}_2$ ,  $\text{HfB}_2$ ,  $\text{MoB}_2$ ,  $\text{NbB}$ ,  $\text{NbB}_2$ ,  $\text{TaB}$ ,  $\text{TaB}_2$ ,  $\text{TiB}_2$ ,  $\text{VB}_2$ ,  $\text{WB}$ ,  $\text{ZrB}_2$ ,  $\text{CrB}$ ,  $\text{CrB}_2$ ,  $\text{CeB}_6$ ,  $\text{LaB}_6$ , and  $\text{SmB}_6$ ."

Generally, when a deposition method such as sputtering used in forming a magnetic recording medium is used, a gas element compound such as an oxide or a nitride partially vaporizes as oxygen or nitrogen during film formation, and omission occurs in the compound. However, with the use of a boride as a grain boundary material consistent with the claims of the subject application, omission rarely occurs, since no vaporization occurs. Thus, boride has an advantage that no variations are found in crystallinity, and the variance of the magnetostatic characteristics and electromagnetic conversion characteristics is small. In addition, boride has a higher melting point than an oxide, and thus does not easily form a solid solution with crystal grains and is more stable than an oxide. Boron also has no adverse effect on magnetic anisotropy even when diffused in a perpendicular magnetic recording layer. Thus, it is possible to improve the recording/reproduction characteristics as a magnetic recording medium.

Also, in the present invention, the first undercoating layer containing material forming the crystal grains of the second undercoating layer is provided below the second undercoating layer. This makes it possible to improve disturbance of the crystallinity of crystal grains, which readily occurs in a film having crystal grains and a grain boundary region. By thus

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improving the crystallinity, the transition noise of the perpendicular magnetic recording layer formed on the second undercoating layer is further reduced.

Meanwhile, the prior art of record, including the references relied upon in rejecting claims 1-19 fails to disclose or suggest the claimed inventions, including, among other things, a grain boundary material containing a boride.

The '926 application mentions an oxide and a nitride as a material that may be contained in a boundary region separating crystal grains of an undercoating layer, but the '926 application fails to disclose or suggest using boride. The other references relied upon fail to make up for the shortcomings of the '926 application.

In particular, Oikawa '520 does not disclose or suggest an undercoating layer formed by crystal grains and a boundary region separating the crystal grains. Additionally, Oikawa '520 discloses using an oxide as a boundary region, but does not disclose or suggest using boride as a grain boundary material.

Shimizu also does not disclose or suggest an undercoating layer having crystal grains and a boundary region separating the crystal grains. Further, Shimizu does not disclose or suggest using a boride as a grain boundary material.

#### Double Patenting Rejection

In paragraph 3 of the Office Action, claims 1-19 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 of copending application No. 10/788259 (US 2004/0224185) in view of Shimizu or Oikawa '926. This rejection is respectfully traversed.

Initially, it is noted that the rejection should be a "provisional" rejection since the claims of the copending application have not in fact been patented.

Regardless, the '259 application discloses a nitride and a carbide as a boundary region, but does not disclose or suggest using a boride as a grain boundary material, as claimed. Additionally, as set forth above, neither Shimizu nor Oikawa disclose or suggest using a boride as recited in the instant claims.

Accordingly, withdrawal of the provisional rejection is respectfully requested.

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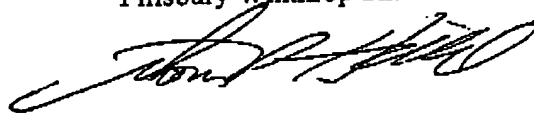
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With all outstanding issues having been addressed and all claims allowable over the prior art of record, allowance of the application is respectfully requested.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted.

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